

Claims

We claim:

1. A method for converting an adaptively sampled distance field of a graphics model to a triangle model, the adaptively sampled distance field including a plurality of surface cells storing distance values having corresponding gradients, comprising:

assigning a vertex to a center location of each surface cell;

connecting the vertices of neighboring surface cells to form triangles while satisfying a predetermined constraint; and

moving each vertex, in a single step, to a new location according to the distance value and corresponding gradient of the vertex to substantially conform the triangles to a surface of the model.

2. The method of claim 1 wherein each surface cell has edges connecting corners of the cells, and some neighboring surface cells have common edges and the predetermined constraint further comprises:

only connecting vertices in three neighboring surface cells having common edges, and at least one common edge intersects the surface of the graphics model.

3. The method of claim 2 further comprising;

deriving an orientation for each triangle from an orientation of the at least one common edge intersecting the surface.

4. The method of claim 2 further comprising:

considering less than all common edges of a particular surface cell when connecting the vertices.

5. The method of claim 4 wherein the considered edges connect to two diagonally opposing corners of the surface cell.

6. The method of claim 1 wherein the adaptively sampled distance field includes a root surface cell, intermediate surface cells, and leaf surface cells arranged in layers of a hierarchical tree, and wherein vertices are assigned only to leaf cells.

7. The method of claim 1 wherein the adaptively sampled distance field includes a root surface cell, intermediate surface cells, and leaf surface cells arranged in layers of a hierarchical tree, and wherein vertices are assigned to all surface cells up to a predetermined level in the hierarchical tree.

8. The method of claim 1 wherein the adaptively sampled distance field includes a root surface cell, intermediate surface cells, and leaf surface cells arranged in layers of a hierarchical tree, and each cell has an associated error measure, and the vertices are assigned to cells having a particular error measure less than a predetermined threshold.